PATENT CLAIMS

1. Airborne radar device (1) comprising at least two antennas (2, 3) and clutter-suppressing means (4), the radar device being arranged to send out, via the antennas (2, 3), radar pulses focused in main lobes (5) and the antennas (2, 3) are arranged to receive reflected radar pulses, the antennas (2, 3) being separated from each other vertically, the radar device (1) comprising means (6) for transforming the received radar pulses into complex video signals in the form of sequences of bins (R_k), the video signals being represented in a first channel (K_1) and a second channel (K_2), characterized in that the clutter-suppressing means (4) is arranged in such a way that the clutter component (e_c) of a certain bin (R_k) in the first channel (K_1) is also found in the second channel (K_2) multiplied by a complex constant ($C(R_k)$), where the complex constant ($C(R_k)$) is the quotient between the complex antenna gain of the second channel (K_2) and of the first channel in the direction of the ground for the current bin (R_k), the clutter-suppressing means (4) being arranged to estimate a complex constant ($\hat{C}(R_k)$) which describes how the signals from the receiver antennas are weighted together separately for each bin (R_k) when the resultant video output signal (Ψ) is formed, the estimated constant ($\hat{C}(R_k)$) being intended to suppress the clutter component (e_c) in the resultant video output signal (Ψ) by subtraction of the second channel (K_2) from the first channel (K_1) multiplied by the estimated constant ($\hat{C}(R_k)$).

2. A radar device according to Claim 1, characterized in that the radar device comprises means for representing the video signal from the first antenna (2) in the first channel (K_1) and means for representing the video signal from the second antenna (3) in the second channel (K_2).

3. A radar device according to Claim 1, characterized in that the radar device comprises means for summing the signals from pairs of antennas

included in the radar system in the second channel (K_2) and means for forming the difference between the signals from pairs of antennas included in the radar system in the first channel (K_1).

4. Radar device according to any of the preceding claims, characterized in that the clutter-suppressing means (4) is set up for estimating the complex constant ($\hat{C}(R_k)$) by utilizing the values from range bins in the vicinity of the current range bin ($\hat{C}(R_k)$).

5. Radar device according to any of the preceding claims, characterized in that the clutter-suppressing means (4) is set up for estimating the complex constant ($\hat{C}(R_k)$) by adapting a polynomial of degree "m" with coefficients "c_m", wherein the polynomial describes variations over a number of bins centred around the current bin.

6. Radar device according to Claim 5, characterized in that the clutter-suppressing means (4) is set up for determining the coefficients of the polynomial by means of the method of least squares

7. Radar device according to any of the preceding claims, characterized in that the clutter-suppressing means (4) is set up for suppressing clutter without coherence between different pulses sent out.

8. Radar device according to any of the preceding claims, characterized in that the antennas (2, 3) are rolled by ± 15° maximum relative to the ground plane.

9. Method for suppressing ground clutter, comprising the joint sending out of a focussed radar pulse in the form of a main lobe (5) from at least two antennas (2, 3) separated from each other vertically, and receiving reflected radar pulses by the antennas (2, 3), comprising the conversion of the

received radar pulses into complex video signals in the form of a number of bins (R_k), the video signals being represented in a first channel (K_1) and a second channel (K_2), characterized in that

- a clutter component (e_c) multiplied by a complex constant ($C(R_k)$) for a certain bin (R_k) is transmitted in the second channel (K_2), where the complex constant ($C(R_k)$) is the quotient between the second channel (K_2) and the complex antenna gain of the first channel (K_1) in the direction of the ground for the current bin (R_k),
- the clutter component (e_c) for a certain bin (R_k) is transmitted in the first channel (K_1),
- a complex constant ($\hat{C}(R_k)$) is estimated by weighting together the signals from the antennas separately for each bin (R_k) when forming a resultant video output signal (Ψ),
- the estimated constant ($\hat{C}(R_k)$) is multiplied by the first channel (K_1),
- in the resultant video output signal (Ψ), the second channel (K_2) is subtracted from the first channel (K_1) multiplied by the estimated constant ($\hat{C}(R_k)$), which gives rise to the clutter component (e_c) being suppressed in the resultant video output signal (Ψ).

10. Method according to Claim 9, characterized in that the method represents the video signal from the first antenna (2) in the first channel (K_1) and the video signal from the second antenna (3) in the second channel (K_2).

11. Method according to Claim 9, characterized in that the method comprises the summing of the signals from pairs of antennas included in the radar system in the second channel (K_2) and subtracting the signals from antenna pairs included in the radar system in the first channel (K_1).

12. Method according to any of Claims 9-11, characterized in that this estimation of the estimated constant ($\hat{C}(R_k)$) comprises the following steps:

- selection of a polynomial of degree M with a number of complex constants (c_m),
- estimation of the complex constants (c_m) by the method of least squares and the values from a number of bins in the main lobe, which polynomial has the following appearance:

$$\hat{C}(R_k) = \sum_{0}^{M} c_m R_k^m$$

13. Method according to any of Claims 9-12, characterized in that the method suppresses clutter independently of the coherence between the pulses.

14. Method according to any of Claims 9-13, characterized in that the method comprises the sending out and receiving of pulses from antennas which are rolled by ± 15° maximum relative to the ground plane.

15. Method according to any of Claims 9-14, characterized in that the method comprises the sending out and receiving of pulses from a radar device which is airborne.